Virginia Department of Emergency Management

HAZARD RISK & VULNERABLE POPULATIONS

2021 HAZARD MITIGATION ASSISTANCE GRANTS EQUITY WORKSHOPS

The Deloitte Health360 Solution informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects. It is broken down into two components: Population Vulnerability and Hazard Risk. Both components are added together to identify potential priority areas to support future mitigation projects.

POPULATION VULNERABILITY

Provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

HAZARD RISK

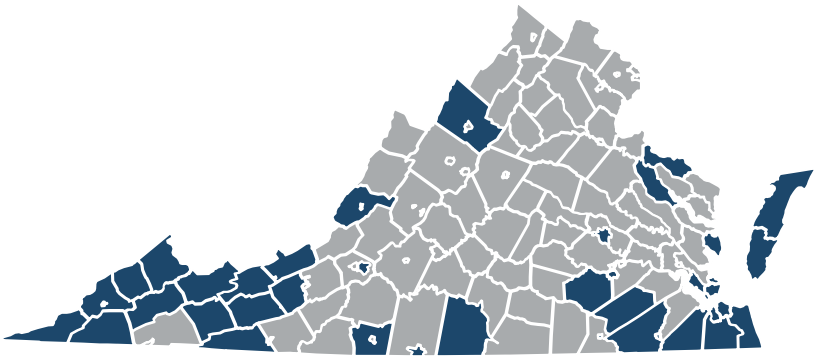
Reflects the number of households in each flood or hurricane zone weighted by risk severity to provide a people-focused risk metric.

PRIORITIZED CENSUS TRACTS

Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

SERIES OBJECTIVES

1. Interpret data from the Deloitte Analysis and identify flooding risk in these areas.
2. Understand and explore potential solutions to hazard risk areas and vulnerable populations.
3. Educate stakeholders on funding programs such as FEMA hazard mitigation grants, CDBG grants, and the new CFP fund.
4. Discuss next steps, technical assistance needs, and training.



40 Localities Identified Scoring Over 70%

REGISTRATION https://odu.co1.qualtrics.com/jfe/form/SV_dd549WZWcIKVz3E

QUESTIONS? vdemgrants@vdem.virginia.gov

HAZARD RISK & POPULATION VULNERABILITY

Virginia Department of Emergency Management

SUBREGIONAL WORKSHOP

June 28, 2021 from 10am to 12pm

- Essex
- Mathews
- Westmoreland

POPULATION VULNERABILITY

Provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

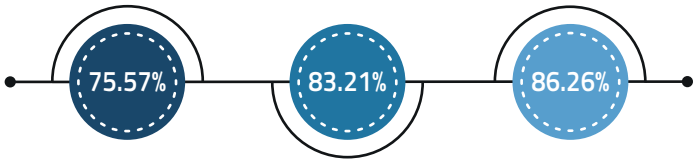
HAZARD RISK

Reflects the number of households in each flood or hurricane zone weighted by risk severity to provide a people-focused risk metric.

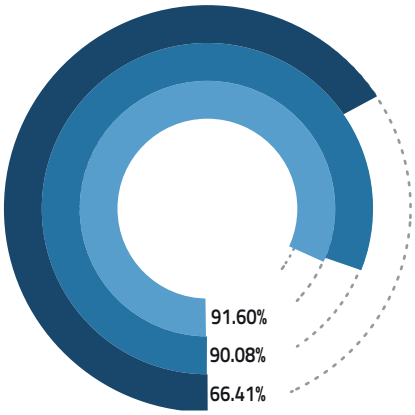
PRIORITIZED CENSUS TRACTS

Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

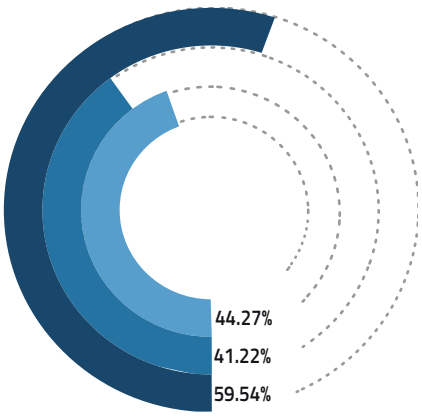
OVERALL PERCENTILE



HAZARD RISK PERCENTILE



POPULATION VULNERABILITY PECENTILE



FACILITATED BY The Virginia Modeling, Analysis, and Simulation Center

COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
WESTMORELAND COUNTY

NOVEMBER 2020

Topics

The analysis provides **Westmoreland County** with information to support planning and preparation of projects for the Building Resilient Infrastructure and Communities (BRIC) grant application with an equity focus.

- ❑ Introduction to Data-Driven Approach
- ❑ Hazard Risk
- ❑ Population Vulnerability
- ❑ Summary
- ❑ FEMA Funding and Past Projects
- ❑ Considerations for Next Steps

This analysis ***expands the scope of population vulnerability*** to provide a ***data-driven equity lens*** for disaster mitigation project design

Data-Driven Approach

The Health360 platform informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects.

Powered By Health360

230M+
U.S. Adults Scored

Data updated every
1 Month

Contains over
1,500+
variables on Social Determinants of Health and other metrics

150+
Advanced predictive algorithms

400+
Variables used in the mortality predictive algorithm

Provides 360° view of a person

Algorithms rebuilt every 2 years

40+
Clients served

What is hazard risk and how is it calculated?

Household Hazard risk reflects the number of households in each flood or hurricane zone, weighted by severity.

Hazard Risk

Number of households in each zone:

Flood zones
- 100 year coastal
- 100 year riverine flood way
- 100 year riverine
- 500 year riverine

Hurricane zones
- Segmented A, B, C, D

- Households that reside in the flood and hurricane zones are considered to be **at-risk for environmental disasters**
- Hazard Risk reflects **the number of households located in Flood and Hurricane Zones**
- Hazard Risk is not a measure of **infrastructure, elevation, or financial risks**, but is a measure of the number of at-risk households in an area, weighted by the severity of the risk, to **provide a people-focused risk metric**

Note: Severity of the risk per household is captured on an ordinal scale from 1 – least severe (Hurricane Zone D, 500 Year Riverine) to 4 – most severe (Hurricane Zone A, 100 Year Coastal)

Hazard Risk = (# of Households Analyzed in Particular Hurricane or Flood Zones) X (Specified Zone Risk Level (1 through 4 depending on risk severity))

Hazard Risk in Your Locality

The figures below indicate how your locality's hazard risk[1] compares to others in Virginia as well as how many households reside in each flood or hurricane zone.

Hazard Risk[1] Percentile

92nd

Your locality has more households in more severe flood/hurricane zones than 92% of other Virginia localities

Hazard Risk[1] Rank

12th

Your locality's Hazard Risk score is ranked 12th out of 132 Virginia localities

Households in Flood Zones & Locality Rank

← Severity			
100 Year Coastal	100 Year Riverine Floodway	100 Year Riverine	500 Year Riverine
3	0	151	20
8th out of 132 Localities	N/A out of 132 Localities	71st out of 132 Localities	80th out of 132 Localities

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk

Households in Hurricane Zones & Locality Rank

← Severity			
Zone A	Zone B	Zone C	Zone D
0	0	3,946	0
N/A out of 132 Localities	N/A out of 132 Localities	7th out of 132 Localities	N/A out of 132 Localities

Evacuation zones designated as A through D are in place across coastal Virginia

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

What is population vulnerability and how is it calculated?

The Population Vulnerability score provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

- Population Vulnerability **expands upon the 2018 Virginia Hazard Mitigation plan definition** of population vulnerability (density and percentage of total population)
- Population Vulnerability **only considers localities with households in flood or hurricane zones (132 localities)**
- Population Vulnerability **identifies the locality and census blocks/Census Blocks** with the most vulnerable individuals/households on average
- Population Vulnerability should be interpreted as a **household's ability to safely respond** to an environmental disaster

Population Vulnerability in Your Locality

The figures below indicate how your locality's population vulnerability[1] score and composite attributes compare to other localities in Virginia.

Population Vulnerability[1] Percentile

44th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 44% of other Virginia localities

Population Vulnerability[1] Rank

74th

Your locality's Population Vulnerability score is ranked 74th out of 132 Virginia localities

How WESTMORELAND COUNTY Compares to Other Localities Across the Eight Vulnerability Attributes

Low Income	Elevated Health Risk	Age	Communities of Color
39th percentile	56th percentile	76th percentile	66th percentile

# of Children in Household	# of People in Household	Unemployment Risk	Lack of Vehicle Access
28th percentile	28th percentile	27th percentile	72nd percentile

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones

Population Vulnerability & Hazard Risk Summary

Understanding population vulnerability and hazard risk in your locality can help support future mitigation projects.

Population Vulnerability[1] Percentile

44th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 44% of other Virginia localities

Hazard Risk[2] Percentile

92nd

Your locality has more households in more severe flood/hurricane zones than 92% of other Virginia localities

Population Vulnerability[1] Rank

74th

Your locality's Population Vulnerability score is ranked 74th out of 132 Virginia localities

Hazard Risk[2] Rank

12th

Your locality's Hazard Risk score is ranked 12th out of 132 Virginia localities

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity

Review of FEMA Funding & Past Mitigation Projects

Review of Mitigation Projects In Your Locality

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Total Exclusive Project Funding[1]

$33,161

This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

Total Shared Project Funding[1]

$150,017

This is the total amount of federal funding allotted to mitigation projects owned by your locality and at least 1 other from 1990-2019

Exclusive Projects

3

Average Project Size

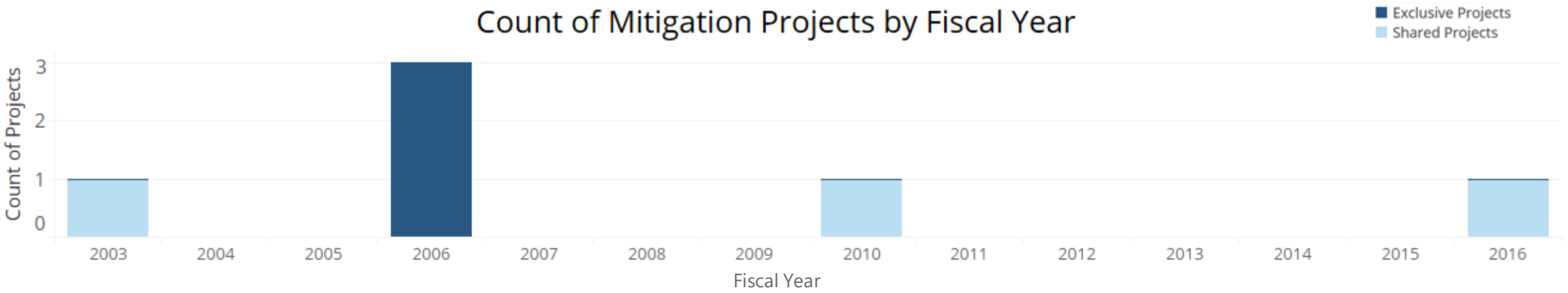
$11K

Shared Projects

3

Average Counties Per Project

5.0

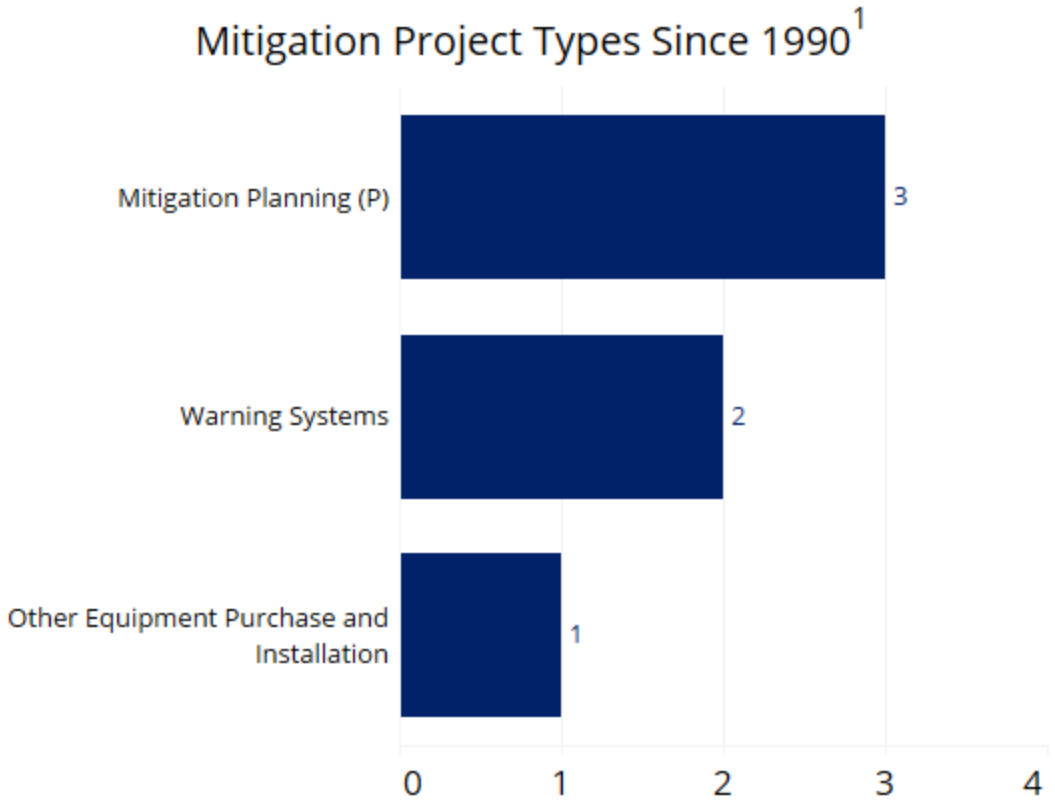


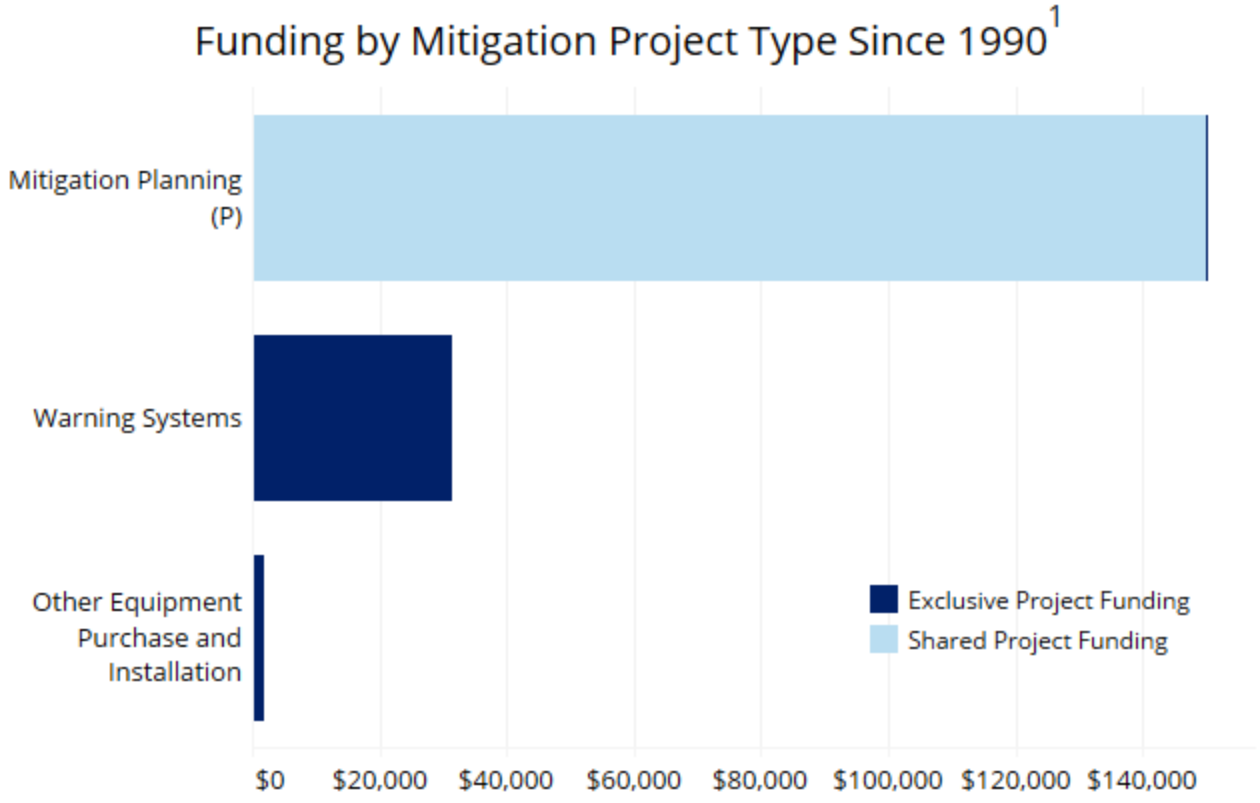
1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

Past Mitigation Projects – Top Project Types

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.





1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

COVID-19 Impacts

COVID-19 In Your Locality

Since the beginning of the COVID-19 Pandemic, Westmoreland County has experienced the following:

Cases[1]

Total	Per 100k
333 **82nd** out of 133 localities[2]	**1,888** **53rd** out of 133 localities

Hospitalizations[1]

Total	Per 100k
25 **75th** out of 133 localities	**142** **48th** out of 133 localities

Deaths[1]

Total	Per 100k
5 **85th** out of 133 localities	**28** **71st** out of 133 localities

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/19/2020**
2. COVID-19 Impact rankings are for all 133 Virginia localities, rather than the 132 included in the BRIC analysis for having at least one household in a flood or hurricane zone

Considerations for Next Steps

Considerations for Next Steps

When evaluating future mitigation project opportunities, the population vulnerability and hazard risk metrics can supplement existing measures to design mitigation projects with an equity lens.

- Consider **population vulnerability** and it's various components to support decisions on mitigation projects
- Consider **supplementing these people-focused metrics** with existing infrastructure, elevation, and financial analysis for a holistic mitigation planning approach that includes equity considerations
- Consider **past project types** and **prior funding** in the overall mitigation strategy

Appendix

What is population vulnerability and how is it calculated? *continued*

The vulnerability score for each Virginia household reflects an estimate of the household's ability to safely respond in the event of an environmental disaster.

Population Vulnerability

Attribute[1]	Weighting[2]	Description (in a household)
Low Income	18%	Number of adults with income less than $30,000
Elevated Health Risk	17%	Number of adults with one or more serious health conditions
Age (Older Adults)	15%	Number of adults who are age 65 and older
Communities of Color	13%	Number of Black or African American or Hispanic or Latino adults
# of Children in Household	12%	Number of children
# of People in Household	10%	Number of adults and children
Unemployment Risk	8%	Number of adults at high risk of unemployment
Lack of Vehicle Access	6%	Does the household lack access to a motor vehicle?

1. Two attributes - English as a Primary Language and Prevalence of Mobile Housing - were dropped from consideration based on the 8/20/2020 BRIC Working Group Session
2. Attribute contributions to Population Vulnerability were weighted as a result of the BRIC Working Group Session on 8/20/2020

Data table | FEMA Funding[1]

Grantee	Year of Fiscal Year	Exclusive vs Shared	Subgrantee	Project Counties	Project Type(s)	Federal Funds Obligated
WESTMORELAND COUNTY	2016	Shared	Northern Neck Planning District Commission	LANCASTER; NORTHUMBERLAND; RICHMOND; WESTMORELAND	91.5: Local Multijurisdictional Multihazard Mitigation Plan - UPDATE	$53,756
	2010	Shared	Northern Neck Planning District Commission	LANCASTER; NORTHUMBERLAND; RICHMOND; WESTMORELAND	91.1: Local Multihazard Mitigation Plan	$37,501
	2006	Exclusive	Westmoreland (County)	WESTMORELAND	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan); 602.1: Other Equipment Purcha..	$31,395
					602.1: Other Equipment Purchase and Installation	$1,766
	2003	Shared	NORTHERN NECK PLANNING DISTRICT COMMISSION	RICHMOND; NORTHUMBERLAND; LANCASTER; WESTMORELAND	91.1: Local Multihazard Mitigation Plan	$58,760

1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
MATHEWS COUNTY

NOVEMBER 2020

Topics

The analysis provides **Mathews County** with information to support planning and preparation of projects for the Building Resilient Infrastructure and Communities (BRIC) grant application with an equity focus.

- ❑ Introduction to Data-Driven Approach
- ❑ Hazard Risk
- ❑ Population Vulnerability
- ❑ Summary
- ❑ FEMA Funding and Past Projects
- ❑ Considerations for Next Steps

This analysis ***expands the scope of population vulnerability*** to provide a ***data-driven equity lens*** for disaster mitigation project design

Data-Driven Approach

The Health360 platform informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects.

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150+
Advanced predictive algorithms

400+
Variables used in the mortality predictive algorithm

Provides 360° view of a person

Algorithms rebuilt every 2 years

40+
Clients served

What is hazard risk and how is it calculated?

Household Hazard risk reflects the number of households in each flood or hurricane zone, weighted by severity.

Hazard Risk

Number of households in each zone:

Flood zones
- 100 year coastal
- 100 year riverine flood way
- 100 year riverine
- 500 year riverine

Hurricane zones
- Segmented A, B, C, D

- Households that reside in the flood and hurricane zones are considered to be **at-risk for environmental disasters**
- Hazard Risk reflects **the number of households located in Flood and Hurricane Zones**
- Hazard Risk is not a measure of **infrastructure, elevation, or financial risks**, but is a measure of the number of at-risk households in an area, weighted by the severity of the risk, to **provide a people-focused risk metric**

Note: Severity of the risk per household is captured on an ordinal scale from 1 – least severe (Hurricane Zone D, 500 Year Riverine) to 4 – most severe (Hurricane Zone A, 100 Year Coastal)

Hazard Risk = (# of Households Analyzed in Particular Hurricane or Flood Zones) X (Specified Zone Risk Level (1 through 4 depending on risk severity))

Hazard Risk in Your Locality

The figures below indicate how your locality's hazard risk[1] compares to others in Virginia as well as how many households reside in each flood or hurricane zone.

Hazard Risk[1] Percentile

90th

Your locality has more households in more severe flood/hurricane zones than 90% of other Virginia localities

Hazard Risk[1] Rank

14th

Your locality's Hazard Risk score is ranked 14th out of 132 Virginia localities

Households in Flood Zones & Locality Rank

← Severity			
100 Year Coastal	100 Year Riverine Floodway	100 Year Riverine	500 Year Riverine
0	0	665	273
N/A out of 132 Localities	N/A out of 132 Localities	27th out of 132 Localities	24th out of 132 Localities

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk

Households in Hurricane Zones & Locality Rank

← Severity			
Zone A	Zone B	Zone C	Zone D
1,860	0	0	818
11th out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities	10th out of 132 Localities

Evacuation zones designated as A through D are in place across coastal Virginia

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

What is population vulnerability and how is it calculated?

The Population Vulnerability score provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

- Population Vulnerability **expands upon the 2018 Virginia Hazard Mitigation plan definition** of population vulnerability (density and percentage of total population)
- Population Vulnerability **only considers localities with households in flood or hurricane zones (132 localities)**
- Population Vulnerability **identifies the locality and census blocks/Census Blocks** with the most vulnerable individuals/households on average
- Population Vulnerability should be interpreted as a **household's ability to safely respond** to an environmental disaster

Population Vulnerability in Your Locality

The figures below indicate how your locality's population vulnerability[1] score and composite attributes compare to other localities in Virginia.

Population Vulnerability[1] Percentile

41st

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 41% of other Virginia localities

Population Vulnerability[1] Rank

78th

Your locality's Population Vulnerability score is ranked 78th out of 132 Virginia localities

How MATHEWS COUNTY Compares to Other Localities Across the Eight Vulnerability Attributes

Low Income	Elevated Health Risk	Age	Communities of Color
22nd percentile	86th percentile	75th percentile	41st percentile

# of Children in Household	# of People in Household	Unemployment Risk	Lack of Vehicle Access
40th percentile	61st percentile	20th percentile	17th percentile

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones

Population Vulnerability & Hazard Risk Summary

Understanding population vulnerability and hazard risk in your locality can help support future mitigation projects.

Population Vulnerability[1] Percentile

41st

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 41% of other Virginia localities

Hazard Risk[2] Percentile

90th

Your locality has more households in more severe flood/hurricane zones than 90% of other Virginia localities

Population Vulnerability[1] Rank

78th

Your locality's Population Vulnerability score is ranked 78th out of 132 Virginia localities

Hazard Risk[2] Rank

14th

Your locality's Hazard Risk score is ranked 14th out of 132 Virginia localities

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity

Review of FEMA Funding & Past Mitigation Projects

Review of Mitigation Projects In Your Locality

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Total Exclusive Project Funding[1]

$4,598,948

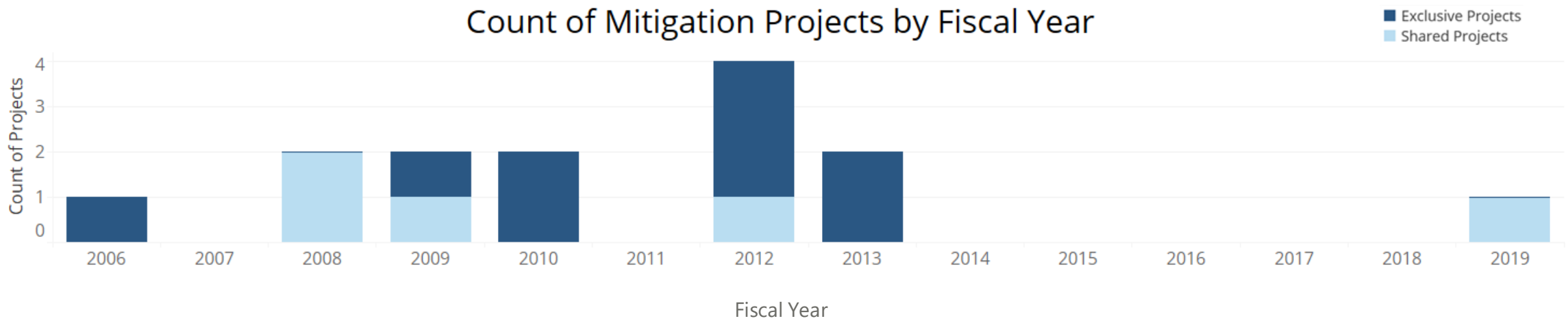
This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

Total Shared Project Funding[1]

$266,905

This is the total amount of federal funding allotted to mitigation projects owned by your locality and at least 1 other from 1990-2019

Exclusive Projects	Average Exclusive Project Size	Shared Projects	Average Counties Per Shared Project
9	$511K	5	5.4

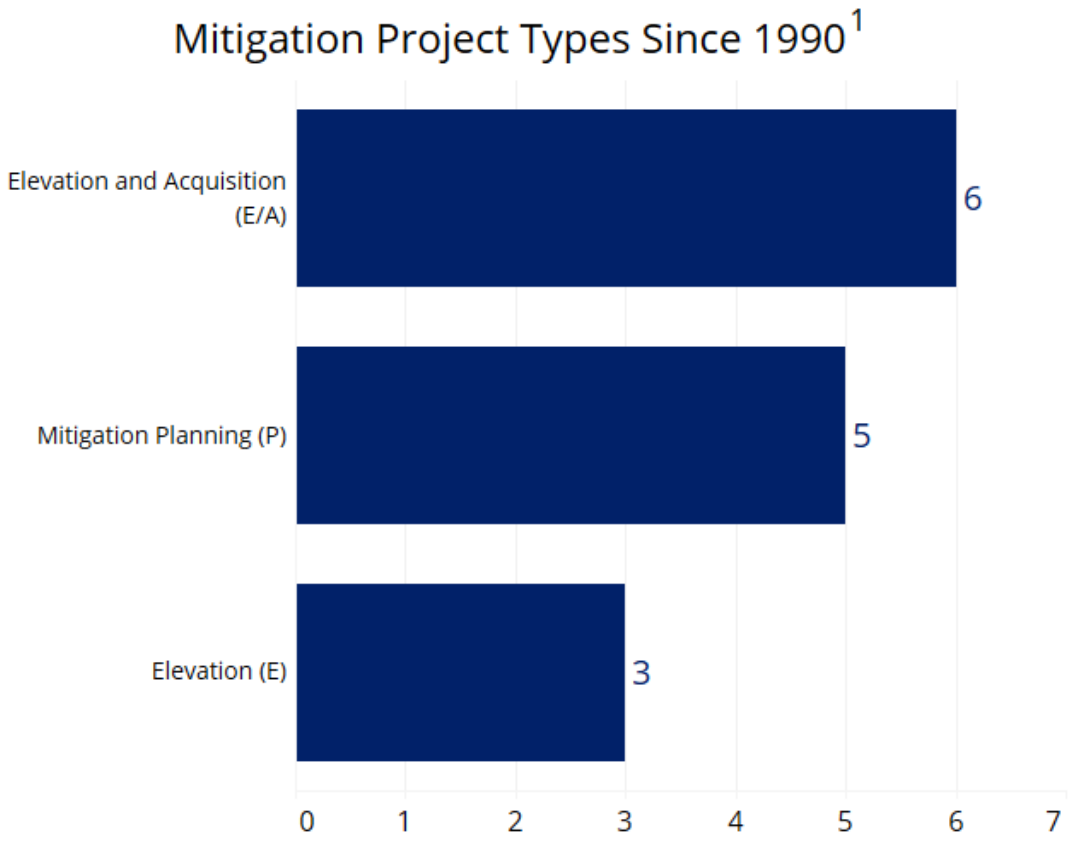


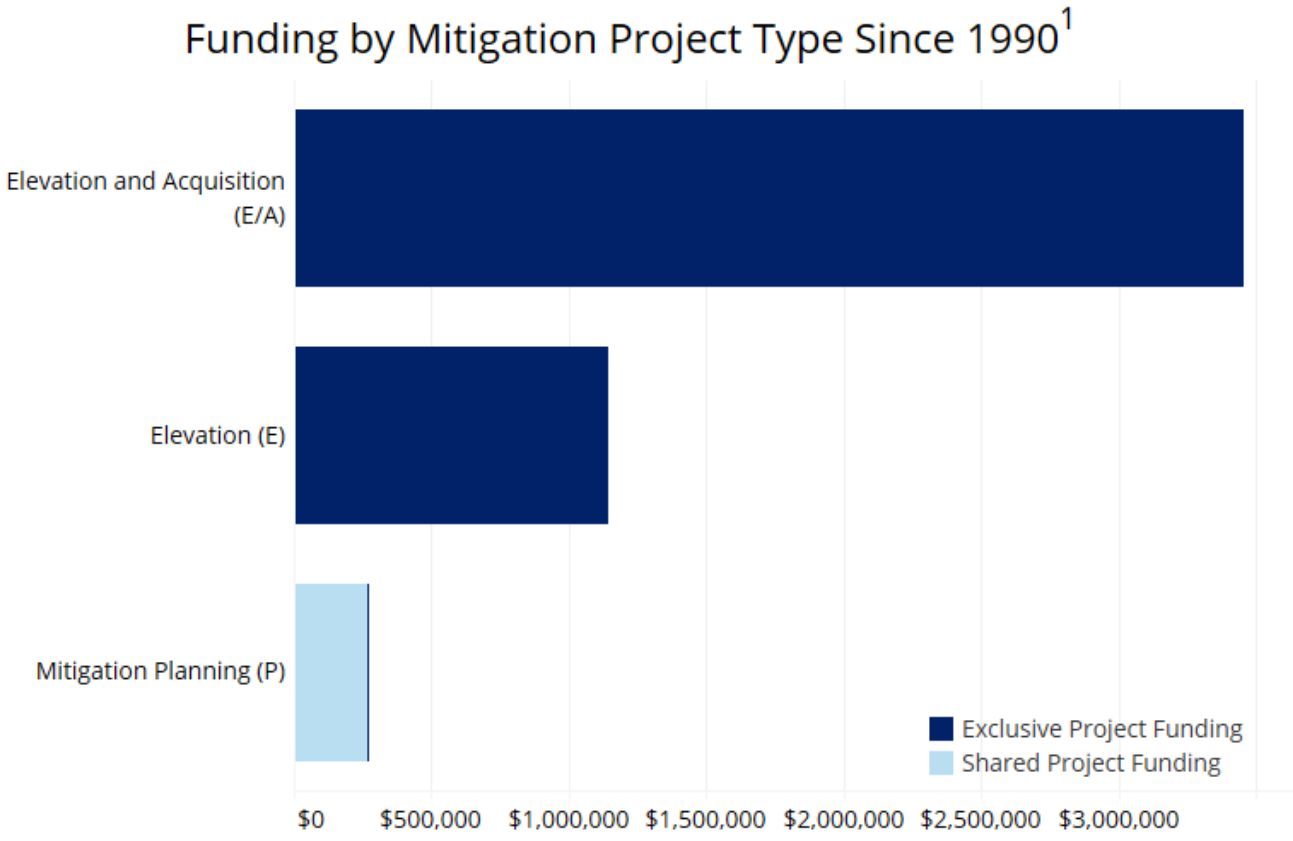
1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

Past Mitigation Projects – Top Project Types

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.





1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

COVID-19 Impacts

COVID-19 In Your Locality

Since the beginning of the COVID-19 Pandemic, Mathews County has experienced the following:

Cases[1]

Total	Per 100k
135	**1,535**
116th out of 133 localities[2]	**85th** out of 133 localities

Hospitalizations[1]

Total	Per 100k
10	**114**
113th out of 133 localities	**66th** out of 133 localities

Deaths[1]

Total	Per 100k
0	**0**
127th out of 133 localities	**127th** out of 133 localities

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/28/2020**
2. COVID-19 Impact rankings are for all 133 Virginia localities, rather than the 132 included in the BRIC analysis for having at least one household in a flood or hurricane zone

Considerations for Next Steps

Considerations for Next Steps

When evaluating future mitigation project opportunities, the population vulnerability and hazard risk metrics can supplement existing measures to design mitigation projects with an equity lens.

- Consider **population vulnerability** and it's various components to support decisions on mitigation projects
- Consider **supplementing these people-focused metrics** with existing infrastructure, elevation, and financial analysis for a holistic mitigation planning approach that includes equity considerations
- Consider **past project types** and **prior funding** in the overall mitigation strategy

Appendix

What is population vulnerability and how is it calculated? *continued*

The vulnerability score for each Virginia household reflects an estimate of the household's ability to safely respond in the event of an environmental disaster.

Population Vulnerability

Attribute[1]	Weighting[2]	Description (in a household)
Low Income	18%	Number of adults with income less than $30,000
Elevated Health Risk	17%	Number of adults with one or more serious health conditions
Age (Older Adults)	15%	Number of adults who are age 65 and older
Communities of Color	13%	Number of Black or African American or Hispanic or Latino adults
# of Children in Household	12%	Number of children
# of People in Household	10%	Number of adults and children
Unemployment Risk	8%	Number of adults at high risk of unemployment
Lack of Vehicle Access	6%	Does the household lack access to a motor vehicle?

1. Two attributes - English as a Primary Language and Prevalence of Mobile Housing - were dropped from consideration based on the 8/20/2020 BRIC Working Group Session
2. Attribute contributions to Population Vulnerability were weighted as a result of the BRIC Working Group Session on 8/20/2020

Data table | FEMA Funding[1]

Grantee	Year of Fiscal Year	Exclusive vs Shared	Subgrantee	Project Counties	Project Type(s)	Federal Funds Obligated
MATHEWS COUNTY	2019	Shared	MIDDLE PENINSULA PLANNING DIST	GLOUCESTER; ESSEX; KING AND QUEEN; KING WILLIAM; MATHEWS; MIDDLESEX	91.5: Local Multijurisdictional Multihazard Mitigation Plan - UPDATE	$102,045
	2013	Exclusive	Mathews (County)	MATHEWS	200.2: Acquisition of Private Real Property (Structures and Land) - Coastal; 202.2: Elevation of Private Structures - Coastal	$1,330,635
	2012	Exclusive	Mathews (County)	MATHEWS	200.2: Acquisition of Private Real Property (Structures and Land) - Coastal; 202.2: Elevation of Private Structures - Coastal	$1,459,853
					202.2: Elevation of Private Structures - Coastal	$676,861
		Shared	MIDDLE PENINSULA PLANNING DIST	MIDDLESEX; MATHEWS; KING WILLIAM; ESSEX; GLOUCESTER; KING AND QUEEN	91.1: Local Multihazard Mitigation Plan	$93,750
	2010	Exclusive	Mathews (County)	MATHEWS	200.2: Acquisition of Private Real Property (Structures and Land) - Coastal; 202.2: Elevation of Private Structures - Coastal	$664,951
	2009	Exclusive	Mathews County	MATHEWS	202.2: Elevation of Private Structures - Coastal	$187,148
		Shared	Middle Peninsula Planning District Commision	ESSEX; GLOUCESTER; KING WILLIAM; MATHEWS; MIDDLESEX	91.1: Local Multihazard Mitigation Plan	$20,010
	2008	Shared	Middle Peninsula Planning District Commission	ESSEX; GLOUCESTER; KING WILLIAM; MATHEWS; MIDDLESEX	91.1: Local Multihazard Mitigation Plan; 95.1: FMA or CRS Plan	$51,100
	2006	Exclusive	Mathews (County)	MATHEWS	202.2: Elevation of Private Structures - Coastal	$279,500

1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
ESSEX COUNTY

NOVEMBER 2020

Topics

The analysis provides **Essex County** with information to support planning and preparation of projects for the Building Resilient Infrastructure and Communities (BRIC) grant application with an equity focus.

- ❑ Introduction to Data-Driven Approach
- ❑ Hazard Risk
- ❑ Population Vulnerability
- ❑ Summary
- ❑ FEMA Funding and Past Projects
- ❑ Considerations for Next Steps

This analysis ***expands the scope of population vulnerability*** to provide a ***data-driven equity lens*** for disaster mitigation project design

Data-Driven Approach

The Health360 platform informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects.

Powered By Health360

230M+
U.S. Adults Scored

Data updated every
1 Month

Contains over
1,500+
variables on Social Determinants of Health and other metrics

150+
Advanced predictive algorithms

400+
Variables used in the mortality predictive algorithm

Provides 360° view of a person

Algorithms rebuilt every 2 years

40+
Clients served

What is hazard risk and how is it calculated?

Household Hazard risk reflects the number of households in each flood or hurricane zone, weighted by severity.

Hazard Risk

Number of households in each zone:

Flood zones
- 100 year coastal
- 100 year riverine flood way
- 100 year riverine
- 500 year riverine

Hurricane zones
- Segmented A, B, C, D

- Households that reside in the flood and hurricane zones are considered to be **at-risk for environmental disasters**
- Hazard Risk reflects **the number of households located in Flood and Hurricane Zones**
- Hazard Risk is not a measure of **infrastructure, elevation, or financial risks**, but is a measure of the number of at-risk households in an area, weighted by the severity of the risk, to **provide a people-focused risk metric**

Note: Severity of the risk per household is captured on an ordinal scale from 1 – least severe (Hurricane Zone D, 500 Year Riverine) to 4 – most severe (Hurricane Zone A, 100 Year Coastal)

Hazard Risk = (# of Households Analyzed in Particular Hurricane or Flood Zones) X (Specified Zone Risk Level (1 through 4 depending on risk severity))

Hazard Risk in Your Locality

The figures below indicate how your locality's hazard risk[1] compares to others in Virginia as well as how many households reside in each flood or hurricane zone.

Hazard Risk[1] Percentile

66th

Your locality has more households in more severe flood/hurricane zones than 66% of other Virginia localities

Hazard Risk[1] Rank

45th

Your locality's Hazard Risk score is ranked 45th out of 132 Virginia localities

Households in Flood Zones & Locality Rank

← Severity			
100 Year Coastal	100 Year Riverine Floodway	100 Year Riverine	500 Year Riverine
2	0	146	72
9th out of 132 Localities	N/A out of 132 Localities	74th out of 132 Localities	53rd out of 132 Localities

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk

Households in Hurricane Zones & Locality Rank

← Severity			
Zone A	Zone B	Zone C	Zone D
0	482	0	0
N/A out of 132 Localities	15th out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities

Evacuation zones designated as A through D are in place across coastal Virginia

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

What is population vulnerability and how is it calculated?

The Population Vulnerability score provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

- Population Vulnerability **expands upon the 2018 Virginia Hazard Mitigation plan definition** of population vulnerability (density and percentage of total population)
- Population Vulnerability **only considers localities with households in flood or hurricane zones (132 localities)**
- Population Vulnerability **identifies the locality and census blocks/Census Blocks** with the most vulnerable individuals/households on average
- Population Vulnerability should be interpreted as a **household's ability to safely respond** to an environmental disaster

Population Vulnerability in Your Locality

The figures below indicate how your locality's population vulnerability[1] score and composite attributes compare to other localities in Virginia.

Population Vulnerability[1] Percentile

60th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 60% of other Virginia localities

Population Vulnerability[1] Rank

54th

Your locality's Population Vulnerability score is ranked 54th out of 132 Virginia localities

How ESSEX COUNTY Compares to Other Localities Across the Eight Vulnerability Attributes

Low Income	Elevated Health Risk	Age	Communities of Color
19th percentile	**91st** percentile	**92nd** percentile	**75th** percentile

# of Children in Household	# of People in Household	Unemployment Risk	Lack of Vehicle Access
21st percentile	**48th** percentile	**29th** percentile	**9th** percentile

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones

Population Vulnerability & Hazard Risk Summary

Understanding population vulnerability and hazard risk in your locality can help support future mitigation projects.

Population Vulnerability[1] Percentile

60th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 60% of other Virginia localities

Hazard Risk[2] Percentile

66th

Your locality has more households in more severe flood/hurricane zones than 66% of other Virginia localities

Population Vulnerability[1] Rank

54th

Your locality's Population Vulnerability score is ranked 54th out of 132 Virginia localities

Hazard Risk[2] Rank

45th

Your locality's Hazard Risk score is ranked 45th out of 132 Virginia localities

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity

Review of FEMA Funding & Past Mitigation Projects

Review of Mitigation Projects In Your Locality

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Total Exclusive Project Funding[1]

$525,000

This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

Total Shared Project Funding[1]

$266,905

This is the total amount of federal funding allotted to mitigation projects owned by your locality and at least 1 other from 1990-2019

Exclusive Projects

2

Average Exclusive Project Size

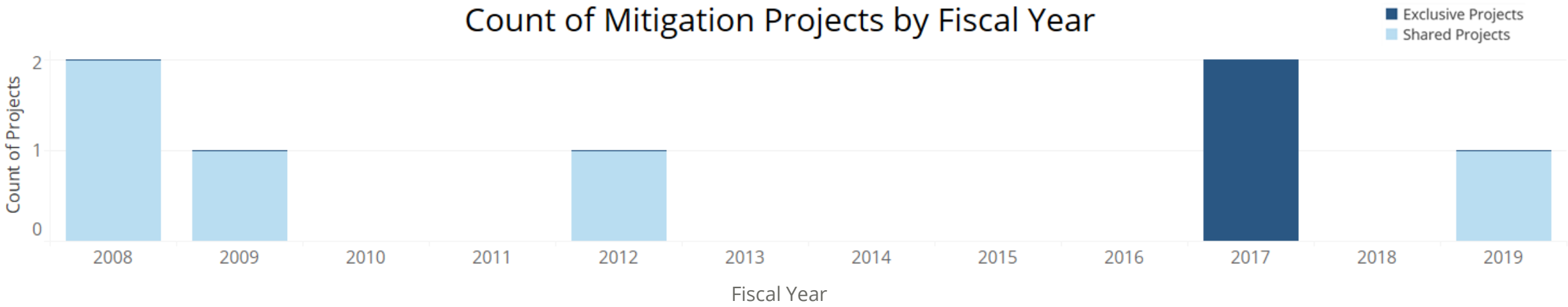
$263K

Shared Projects

5

Average Counties Per Shared Project

5.4

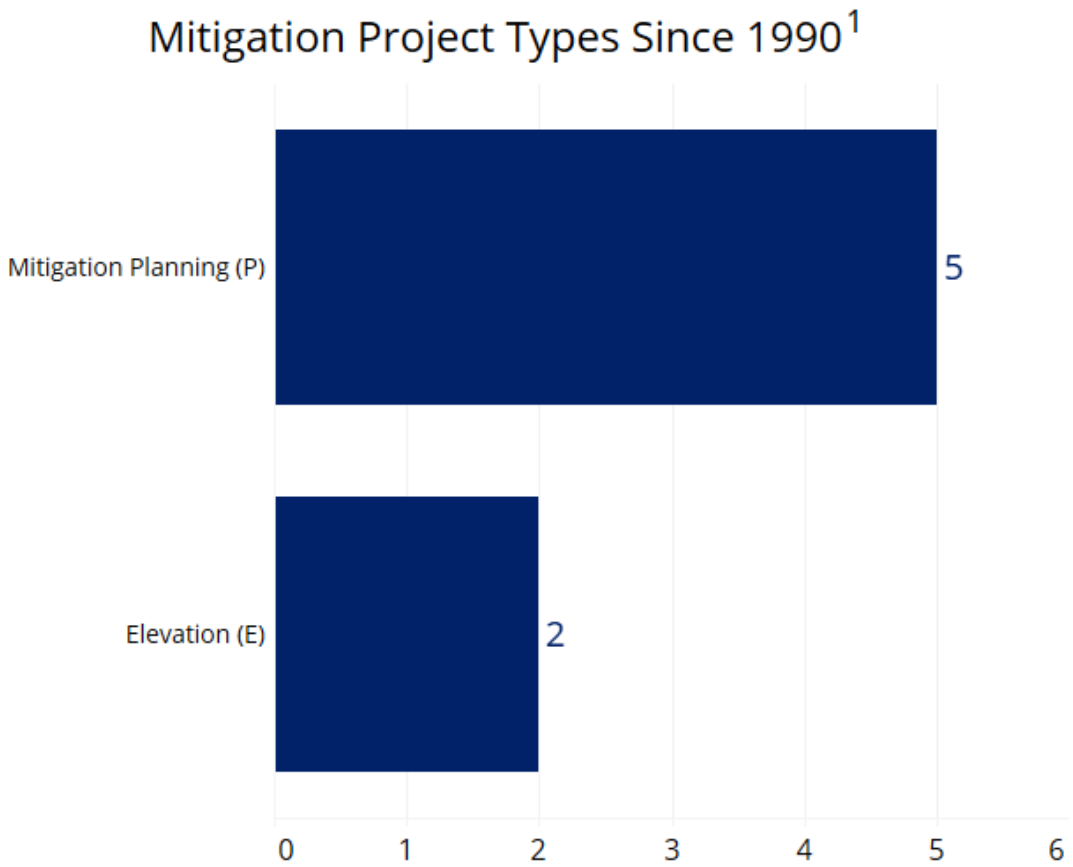


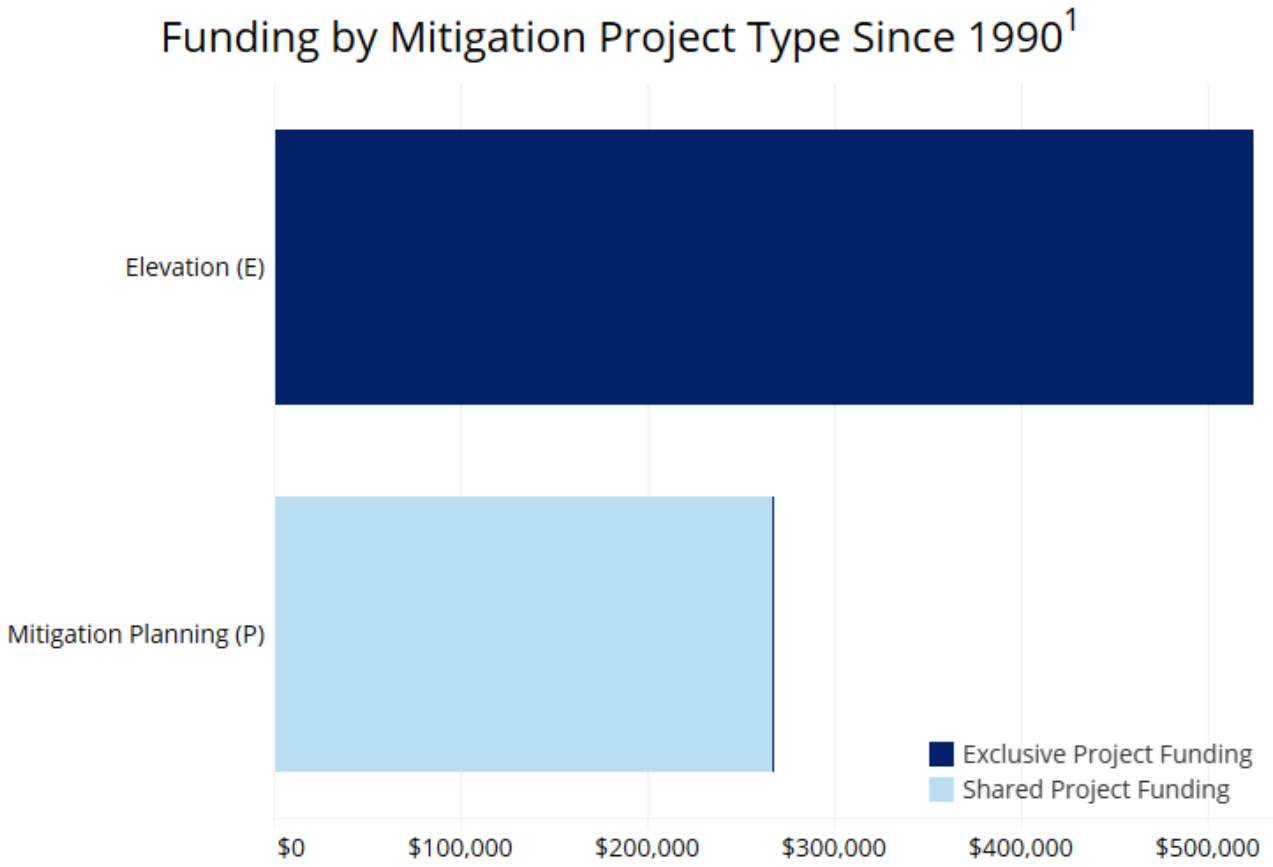
1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

Past Mitigation Projects – Top Project Types

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.





1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

COVID-19 Impacts

COVID-19 In Your Locality

Since the beginning of the COVID-19 Pandemic, Essex County has experienced the following:

Cases[1]

Total	Per 100k
190	**1,722**
105th out of 133 localities[2]	**59th** out of 133 localities

Hospitalizations[1]

Total	Per 100k
13	**118**
105th out of 133 localities	**64th** out of 133 localities

Deaths[1]

Total	Per 100k
2	**18**
110th out of 133 localities	**90th** out of 133 localities

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/21/2020**
2. COVID-19 Impact rankings are for all 133 Virginia localities, rather than the 132 included in the BRIC analysis for having at least one household in a flood or hurricane zone

Considerations for Next Steps

Considerations for Next Steps

When evaluating future mitigation project opportunities, the population vulnerability and hazard risk metrics can supplement existing measures to design mitigation projects with an equity lens.

- Consider **population vulnerability** and it's various components to support decisions on mitigation projects
- Consider **supplementing these people-focused metrics** with existing infrastructure, elevation, and financial analysis for a holistic mitigation planning approach that includes equity considerations
- Consider **past project types** and **prior funding** in the overall mitigation strategy

Appendix

What is population vulnerability and how is it calculated? *continued*

The vulnerability score for each Virginia household reflects an estimate of the household's ability to safely respond in the event of an environmental disaster.

Population Vulnerability

Attribute[1]	Weighting[2]	Description (in a household)
Low Income	18%	Number of adults with income less than $30,000
Elevated Health Risk	17%	Number of adults with one or more serious health conditions
Age (Older Adults)	15%	Number of adults who are age 65 and older
Communities of Color	13%	Number of Black or African American or Hispanic or Latino adults
# of Children in Household	12%	Number of children
# of People in Household	10%	Number of adults and children
Unemployment Risk	8%	Number of adults at high risk of unemployment
Lack of Vehicle Access	6%	Does the household lack access to a motor vehicle?

1. Two attributes - English as a Primary Language and Prevalence of Mobile Housing - were dropped from consideration based on the 8/20/2020 BRIC Working Group Session
2. Attribute contributions to Population Vulnerability were weighted as a result of the BRIC Working Group Session on 8/20/2020

Data table | FEMA Funding[1]

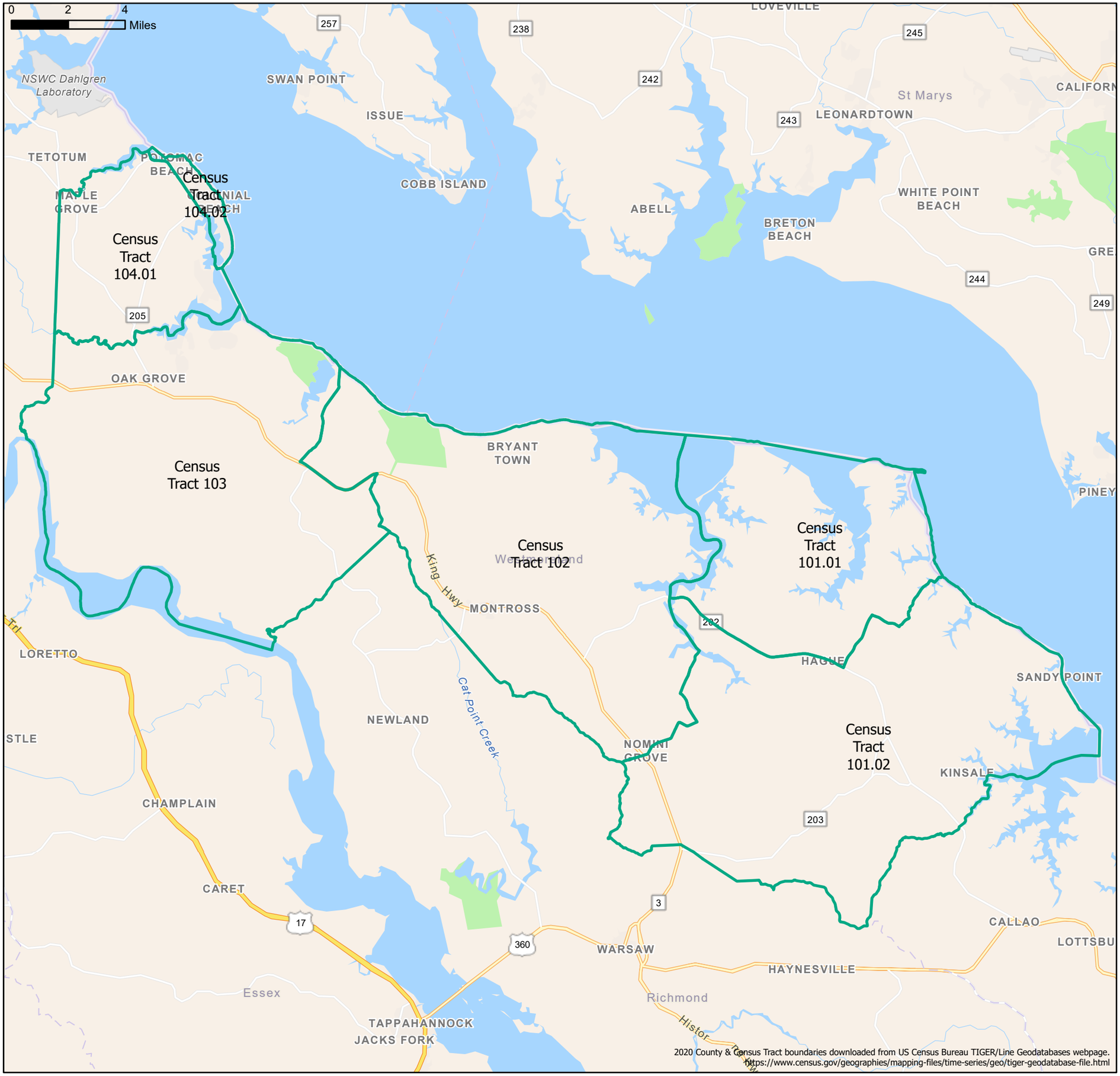
Grantee	Year of Fiscal Year	Exclusive vs Shared	Subgrantee	Project Counties	Project Type(s)	Federal Funds Obligated
ESSEX COUNTY	2019	Shared	MIDDLE PENINSULA PLANNING DIST	GLOUCESTER; ESSEX; KING AND QUEEN; KING WILLIAM; MATHEWS; MIDDLESEX	91.5: Local Multijurisdictional Multihazard Mitigation Plan - UPDATE	$102,045
	2017	Exclusive	Essex County	ESSEX	202.2: Elevation of Private Structures - Coastal	$525,000
	2012	Shared	MIDDLE PENINSULA PLANNING DIST	MIDDLESEX; MATHEWS; KING WILLIAM; ESSEX; GLOUCESTER; KING AND QUEEN	91.1: Local Multihazard Mitigation Plan	$93,750
	2009	Shared	Middle Peninsula Planning District Commision	ESSEX; GLOUCESTER; KING WILLIAM; MATHEWS; MIDDLESEX	91.1: Local Multihazard Mitigation Plan	$20,010
	2008	Shared	Middle Peninsula Planning District Commission	ESSEX; GLOUCESTER; KING WILLIAM; MATHEWS; MIDDLESEX	91.1: Local Multihazard Mitigation Plan; 95.1: FMA or CRS Plan	$51,100

1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Westmoreland County

2020 Census Tract

VDEM GIS | 5/21/2021



2020 County & Census Tract boundaries downloaded from US Census Bureau TIGER/Line Geodatabases webpage. https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-geodatabase-file.html

Mathews County

2020 Census Tract

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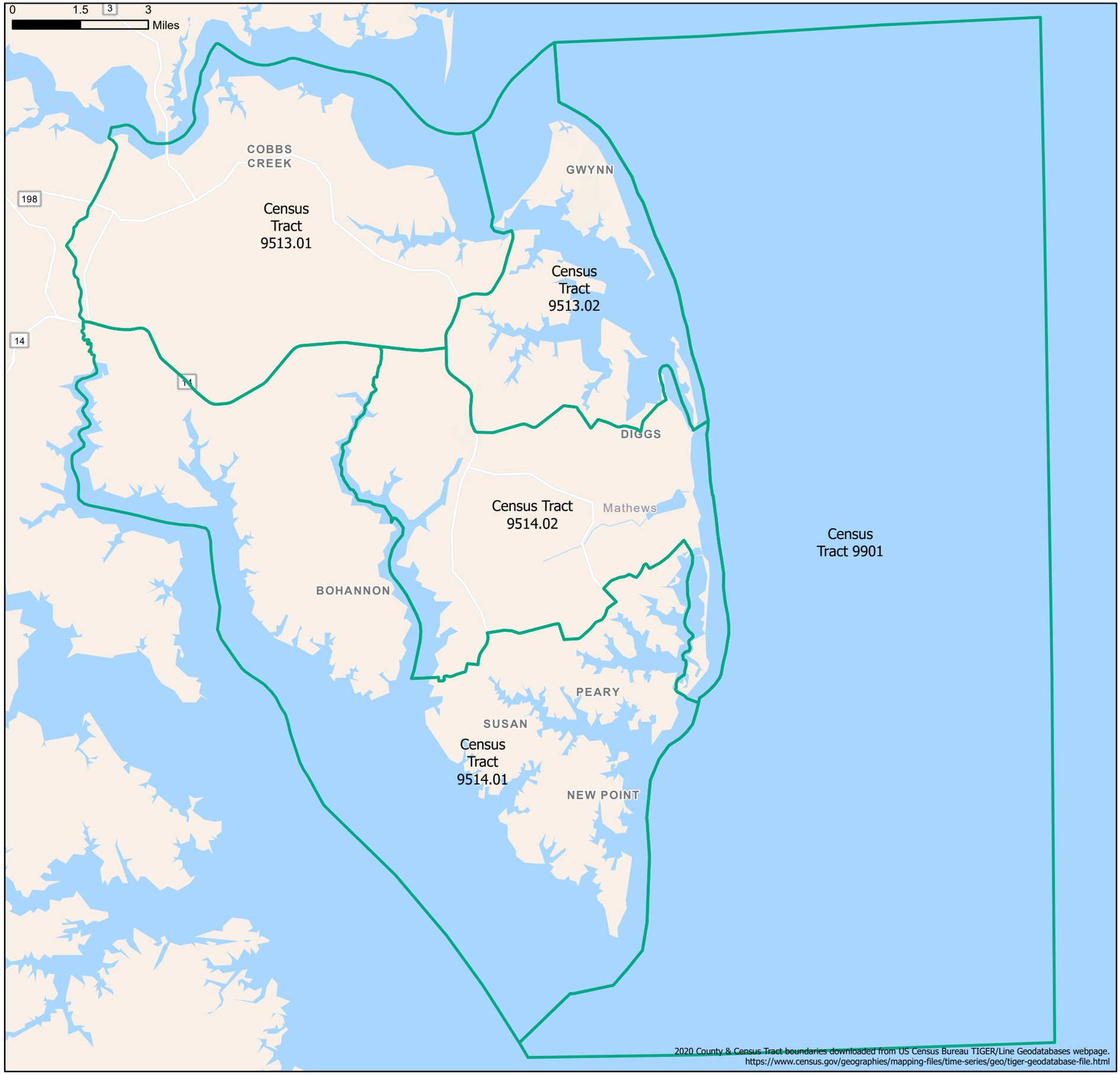

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https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-geodatabase-file.html

2020 Census Tract

Essex County

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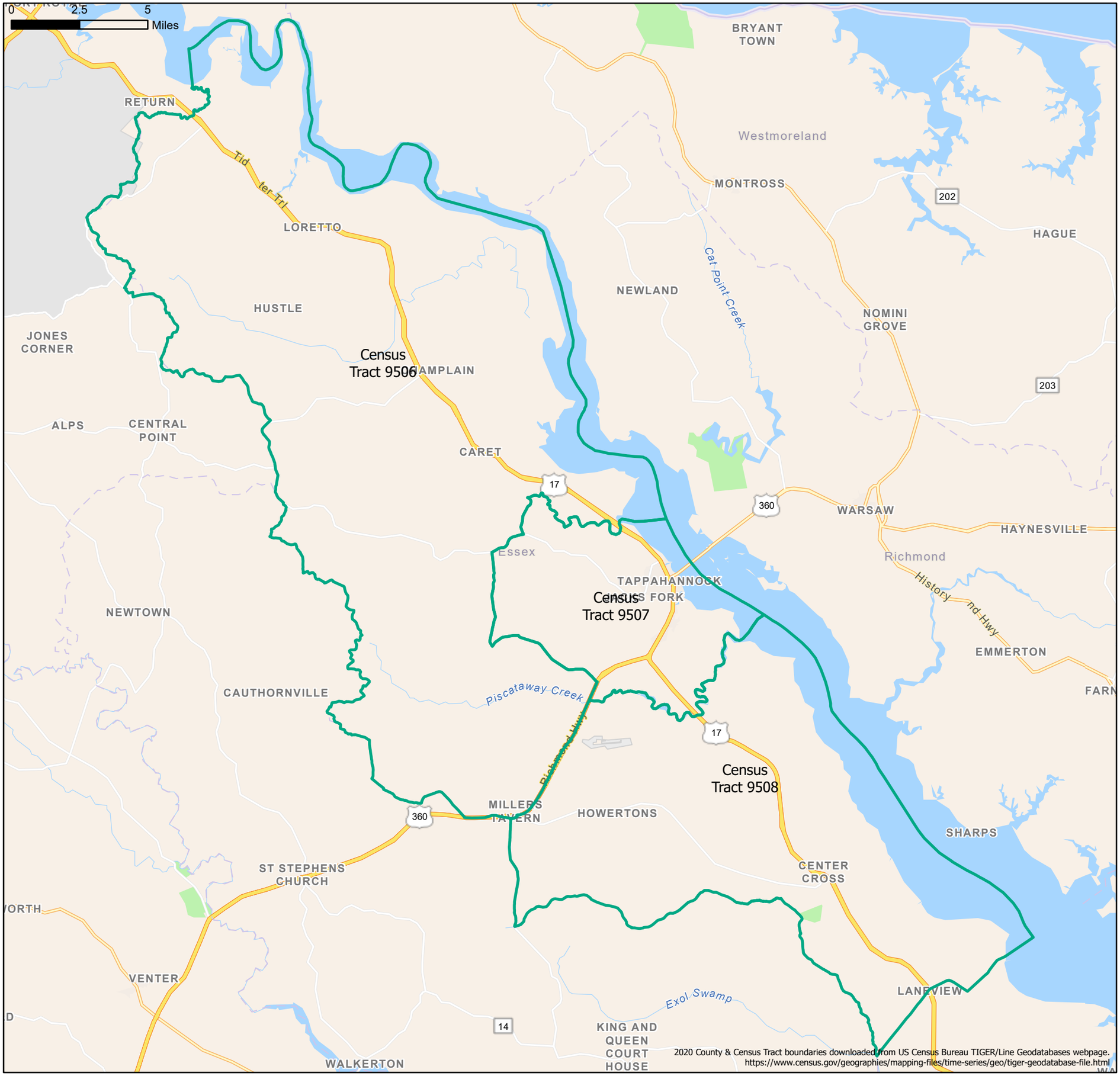

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